Glyceria nervata, Trin.
Glyceria pauciflora, Presl.
Glyceria pallida, Trin.
Festuca microstachys, Nutt.
Festuca ovina, Lin.
Festuca rubra, Lin.
Bromus racemosus, Lin.
Bromus secalinus, Lin.
Bromus breviaristatus, Thurber, Bot. Wilkes's Exped., 493; *Ceratochloa*, Hook.; Thurber, Bot. Cal. ii., p. 321.
Bromus Hookerianus, Thurber, Bot. Wilkes's Exped., 493; *Ceratochloa grandiflora*, Hook.; Thurber, Bot. Cal. ii., p. 321.
Agropyrum repens, Beauv. (*Triticum*, Lin.) Represented in the collection by several forms, one of which has the sheaths and leaves, as well as the lower portion of the culm, clothed with a soft pubescence.

Agropyrum dasystachyum (*Triticum*, Gray; *Triticum repens*, var. *dasystachyum*, Hook.) The specimens accord well with the description of *A. dasyanthum*, Schultes, and, if kept distinct from *A. repens*, perhaps should be referred to that species. The spikelets are sometimes developed abnormally, and one of these is shown in the annexed figure.
Agropyrum caninum, Reichenb. (*Triticum*, Lin.) Both the ordinary or typical form and the mountain form referred to by Dr. Thurber, in Bot. Cal., ii., p. 324, characterized as having large and spreading, usually much crowded spikelets with long, stout divergent awns. Equals No. 656 of Hall & Harbour's coll., 1862.
Agropyrum divergens, Nees. (*Triticum strigosum*, Lessing.) Equals 657 of Hall & Harbour's coll., 1862.
Hordeum nodosum, Lin. Thurber, Bot. Cal., ii., p. 325, (*H. pratense*, Huds.)
Hordeum murinum, Lin.
Elymus Canadensis, Lin.
Elymus Sibiricus, Lin.; equals No. 651 of E. Hall's Oregon coll.
Elymus condensatus, Presl.
Elymus Sitanion, Schult. (*Sitanion elymoides*, Raf.)

The Forms of Leaves.—Mr. Grant Allen's interesting papers on this subject must have engaged the attention of all evolutionary botanists, and very many serious doubts must be felt as to the alleged adequacy of his theory to explain the multiform and composite variations in leaf-forms. Having been attracted lately by the modifications of form to be found in the leaves of *Rhus toxicodendron*, it appeared to me possible to find in this common plant a point of exception to Mr. Allen's hypothesis. Mr. Allen assumes, putting the supply of atmospheric moisture out of the question, or assuming it to be uniform and sufficient, that a competition between neighboring leaves for the possession of carbon molecules, represented in the air by

carbonic anhydride gas, causes unequal growth along their mutual limits and their outlines become broken and assume irregular shapes; segments growing faster than others produce the diversified serrations, elongations, partings and fimbriations which characterize the leaves of different plants, all this however taking place in subordination to the ancestral peculiarities of the plant by which a general ground form or architectural type is preserved. Looking at the leaves of *R. toxicodendron*, we find them arranged in pedunculated, terminal sets of three, one distal and two lateral leaflets. The distal or central leaflet normally, and putting aside the divergent shapes found in this plant, is rhombic-ovate, equilateral, and symmetrically toothed on each side, the two side and proximal leaflets are subrhombic-ovate, inequilateral, and toothed conspicuously on only one side of the free margin. In other words, along the edges of the two lateral leaves where they come in conflict, especially with the edges of the terminal leaf, a restriction of growth takes place, and the usual lobation seen in the end leaf, and which may be considered typical, is suppressed, and on the margin, which is relieved from any competition, this lobation appears. Does not this contradict Mr. Allen's assumption? That there is a struggle for nourishment and that the terminal leaf, in the direct line of the sap's flow, is favorably placed, is seen by the slight growth of the halves of the side-leaflets facing the former, and the natural character of the halves away from it. But the tendency is to obliterate serration at the parts mentioned, and might, we should suppose, under persistent repetition, form an entire edge. A very similar condition of things, with some interesting details, is seen in the leaf-clusters of *Negundo aceroides*.* An interesting change of form in the leaves of the poison ivy takes place when they have been stung by a species of gall-insect (?) at the apex of a leaf. In the terminal leaf it produces an arrest of growth, a deep cleft, and lateral enlargement, which destroys the notched outline, enveloping the lobes in a rounded full blade.

Of course it is not difficult to explain the abortive character of the one side of the leaflets mentioned above. It is due to the predominant shade caused by the expanded sides of the terminal leaflet, which owes its vigour to its favorable position. The conditions presented here are apparently what Mr. Allen would wish, two neighboring leaves contending for the molecules of carbonic anhydride and evidently unequally matched, as appears from the result; but the result does not seem desirable for his theory, as the characteristic toothing is suppressed, not exaggerated in the weaker, and this notching, which he seems to regard as due to impeded growth, is best shown in the stronger competitor.

L. P. GRATACAP.

The Fertilization of Opuntia.—For the purpose of adding brilliancy of color to the window-garden in front of my house, I planted in two separate boxes a large number of plants of *Opuntia vulgaris*, which I obtained from near Hartsdale, Westchester County, N. Y.,

* Mr. A. Hollick gave me the name of this tree, which I had prevlously observed in connection with this subject.